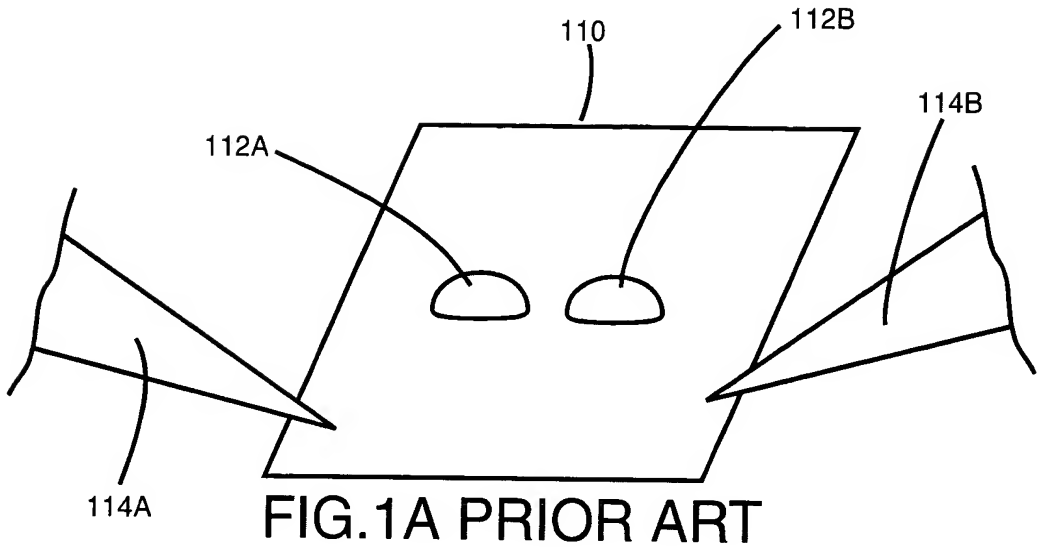


FIG.1A PRIOR ART

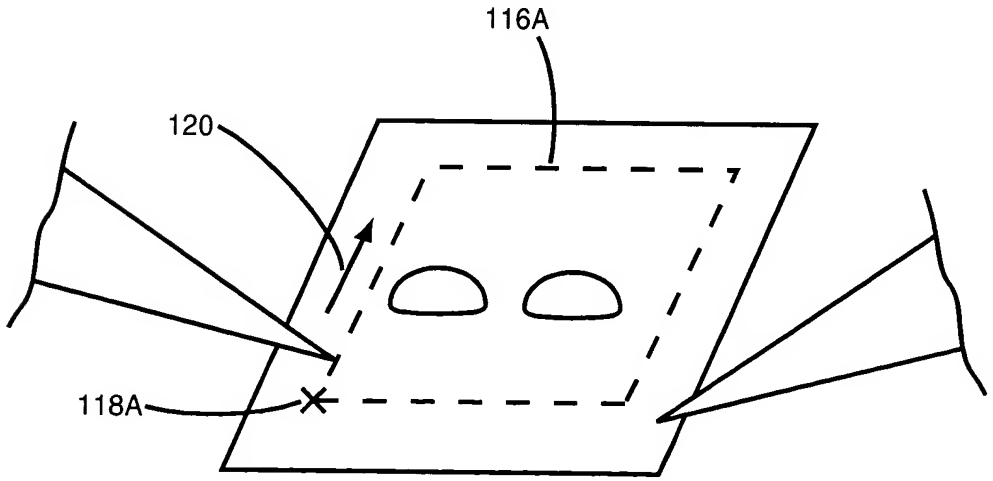


FIG.1B PRIOR ART

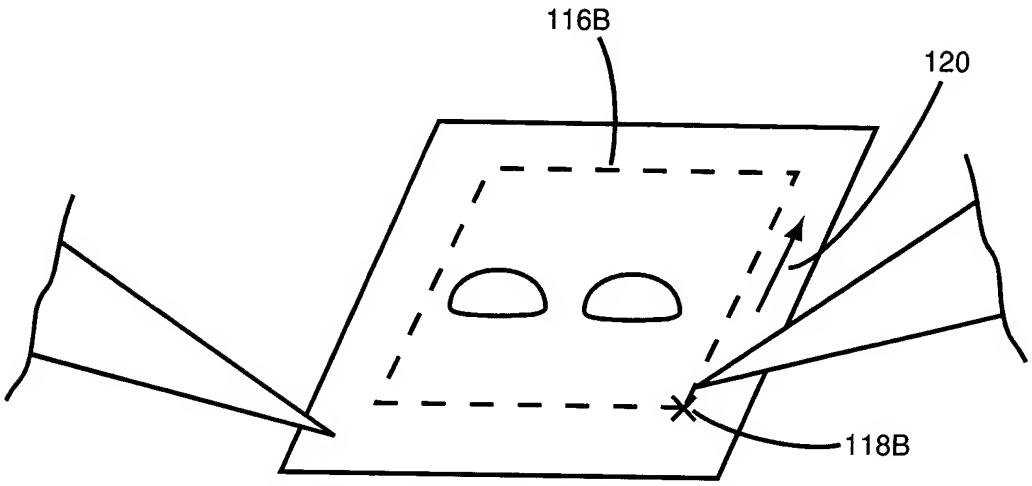


FIG.1C PRIOR ART

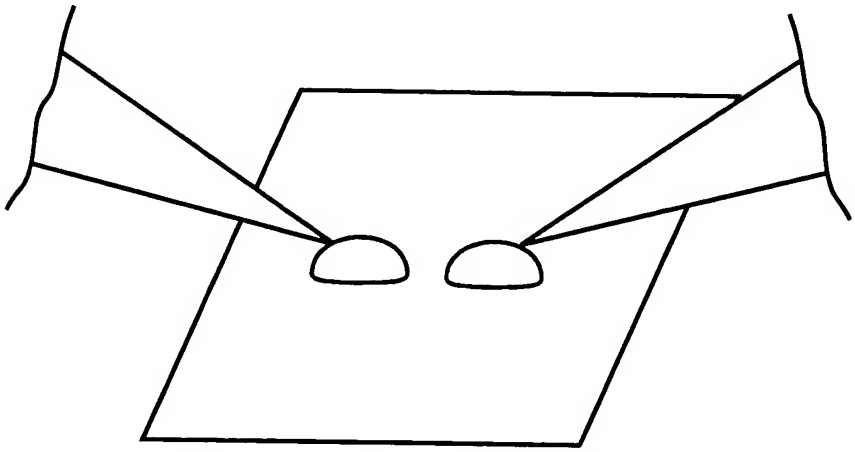


FIG.1D PRIOR ART

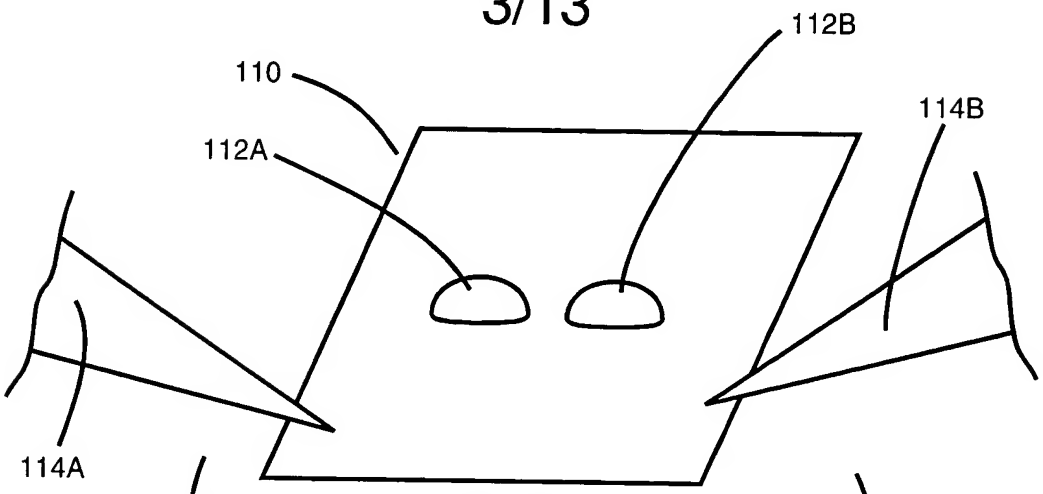


FIG.2A

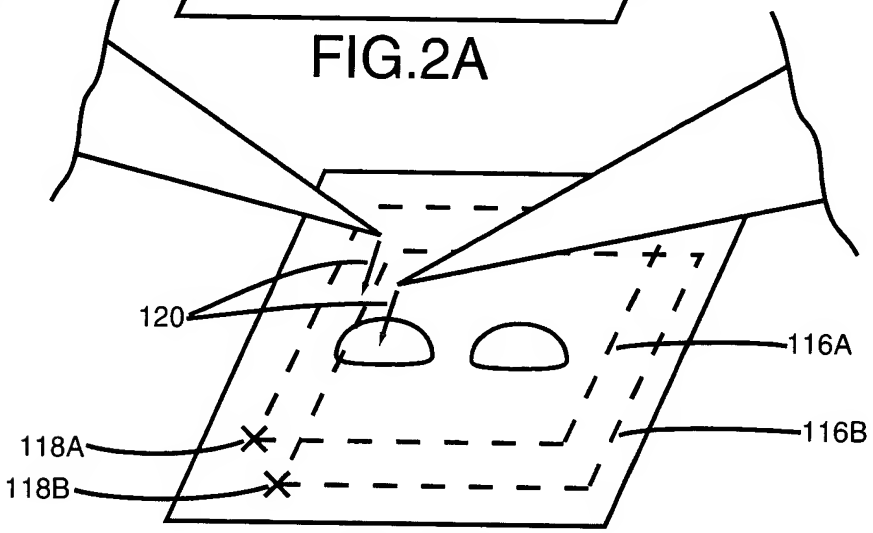


FIG.2B

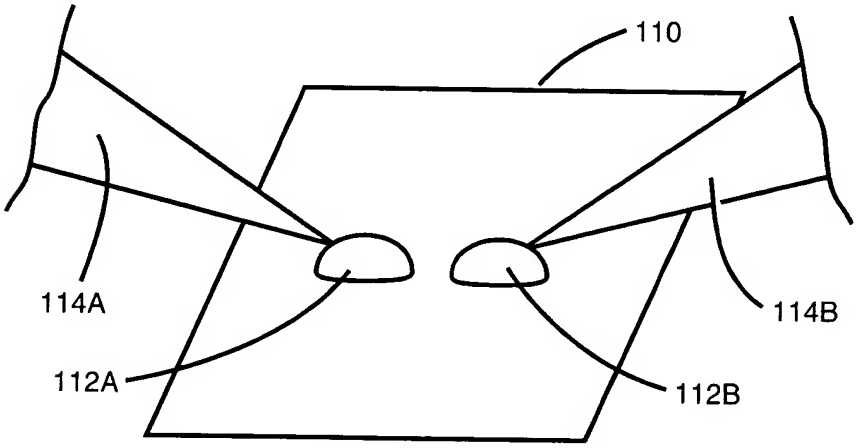


FIG.2C

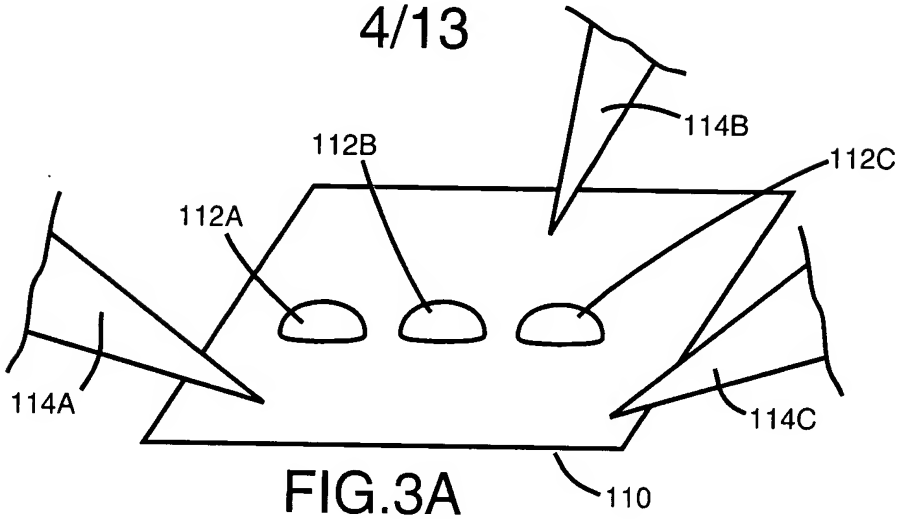


FIG.3A

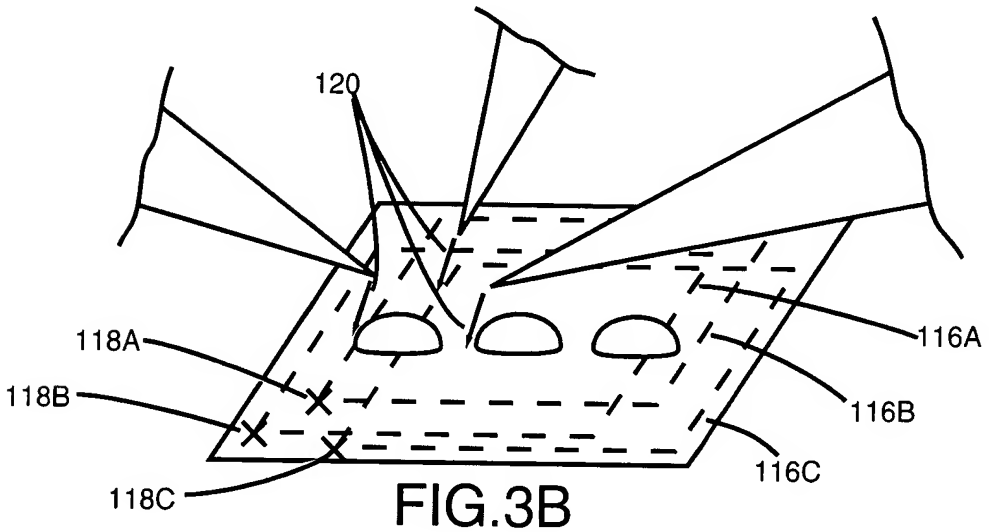


FIG.3B

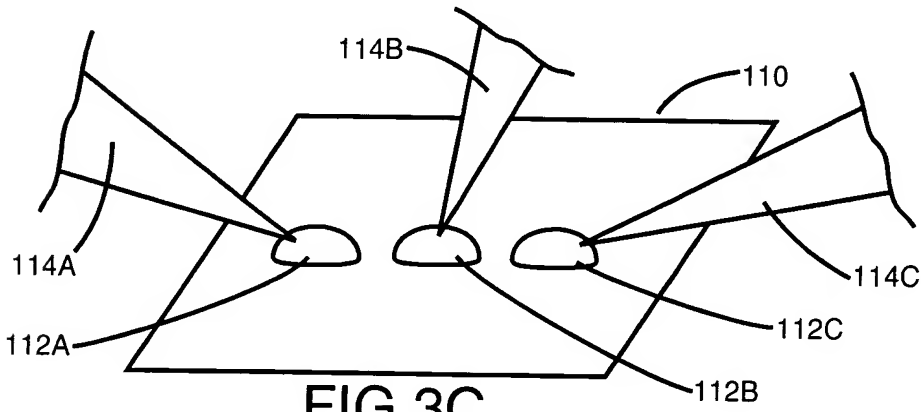


FIG.3C

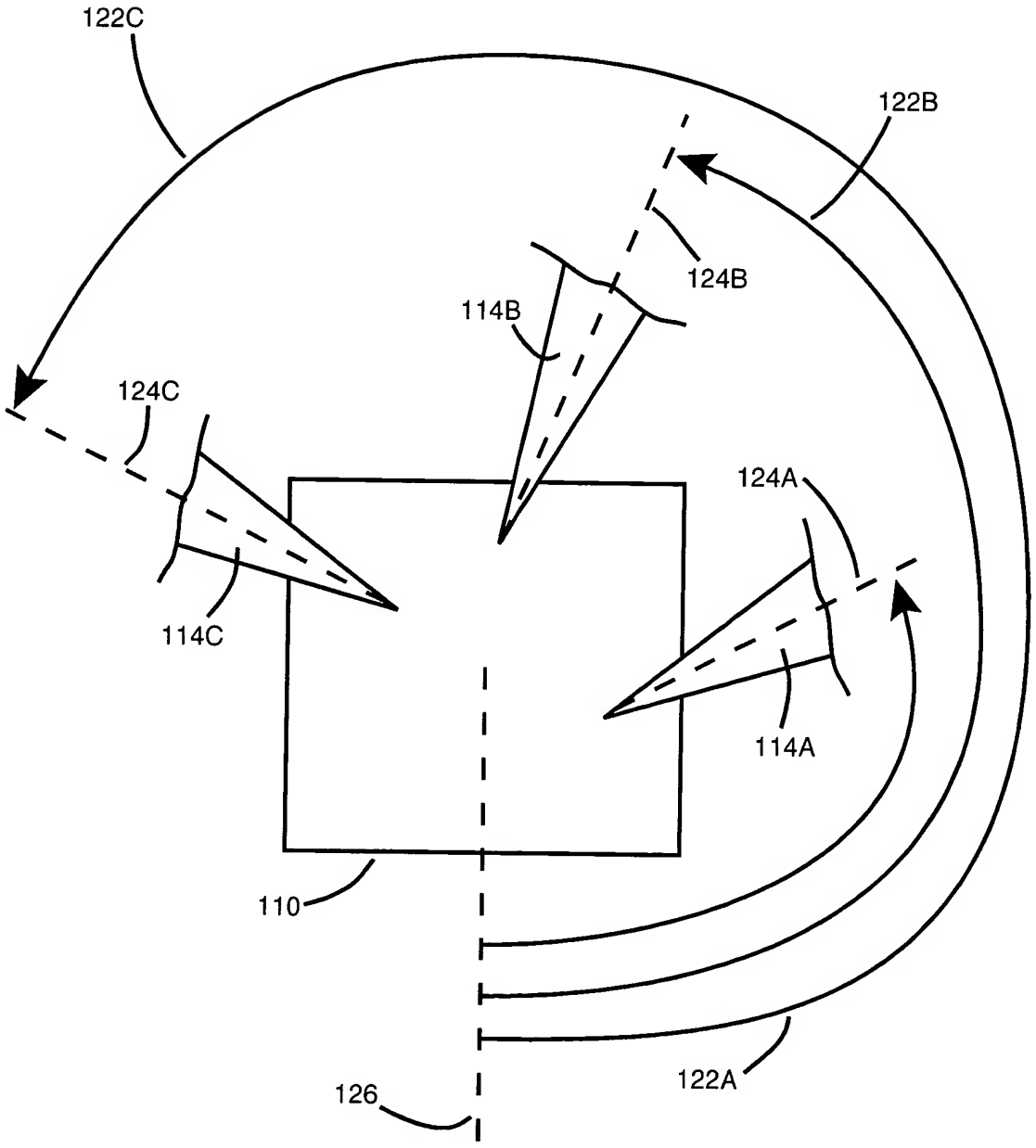
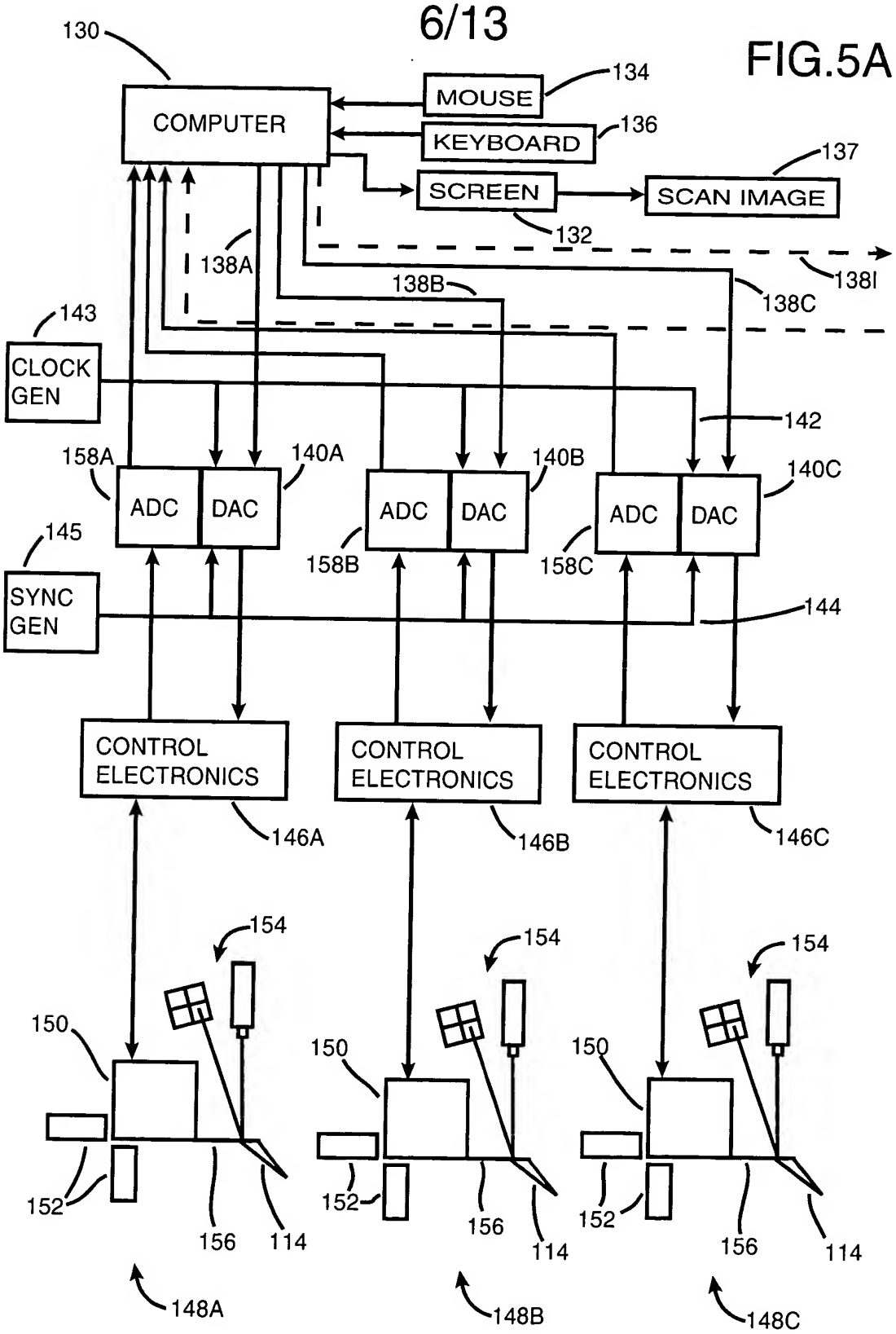


FIG.4

FIG.5A


130
COMPUTER
MOUSE
134
KEYBOARD
136
SCREEN
137
SCAN IMAGE
132
138A
138B
138C
138I
143
CLOCK GEN
142
158A
140A
ADC
DAC
140B
158B
140C
158C
145
SYNC GEN
144
CONTROL ELECTRONICS
146A
146B
146C
154
150
152
156
114
148A
148B
148C

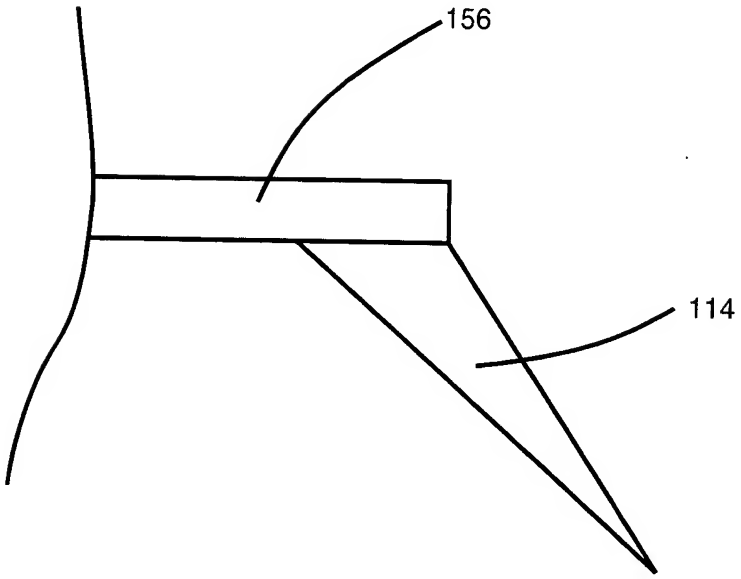


FIG.5B

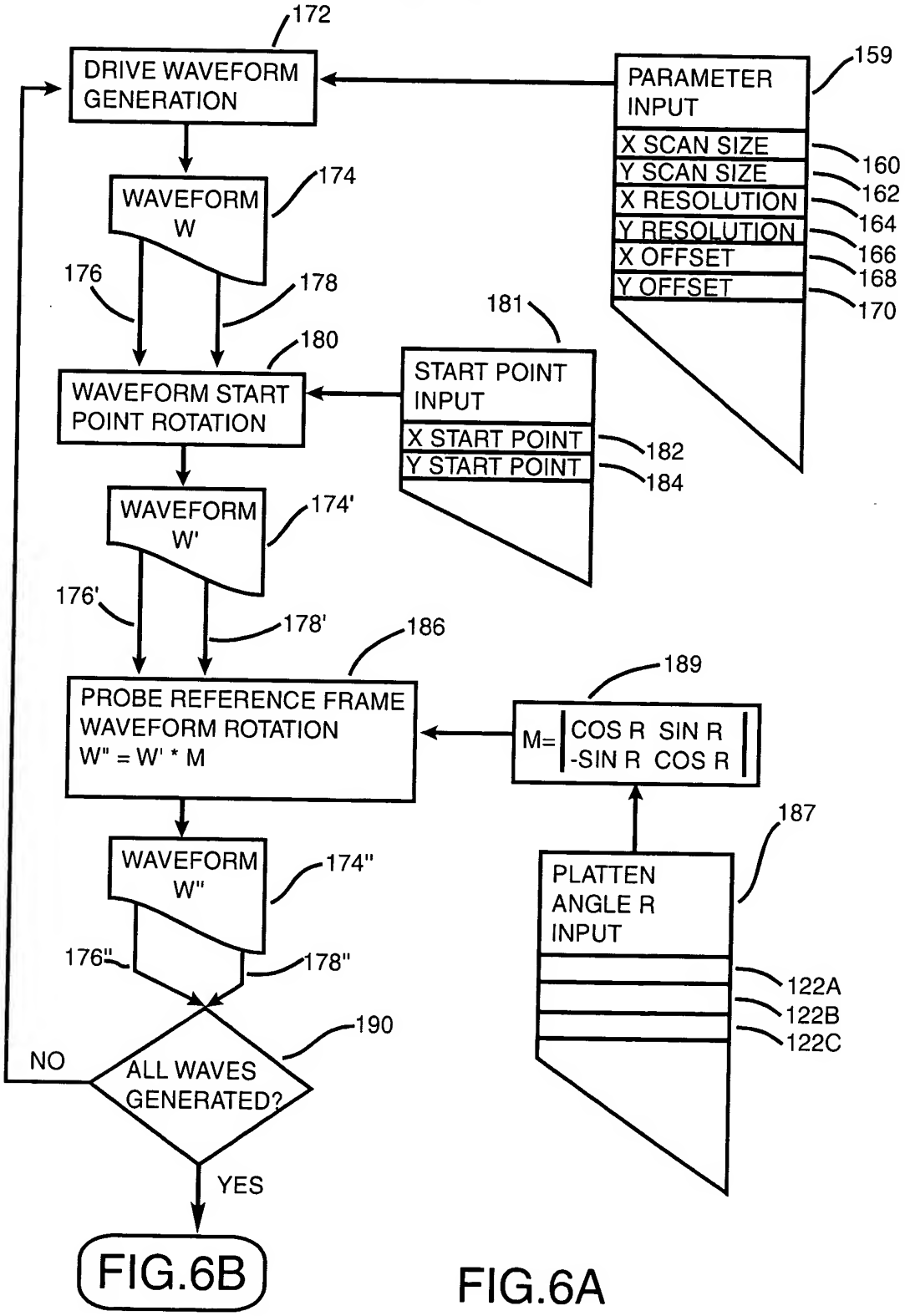

172
DRIVE WAVEFORM GENERATION
159
PARAMETER INPUT
X SCAN SIZE
Y SCAN SIZE
X RESOLUTION
Y RESOLUTION
X OFFSET
Y OFFSET
160
162
164
166
168
170
174
WAVEFORM W
176
178
181
180
START POINT INPUT
WAVEFORM START POINT ROTATION
X START POINT
Y START POINT
182
184
174'
WAVEFORM W'
176'
178'
186
189
PROBE REFERENCE FRAME WAVEFORM ROTATION
W" = W' * M
M= COS R SIN R
-SIN R COS R
187
PLATTEN ANGLE R INPUT
122A
122B
122C
174"
WAVEFORM W"
176"
178"
190
NO
ALL WAVES GENERATED?
YES

FIG.6B

FIG.6A

FIG.6A

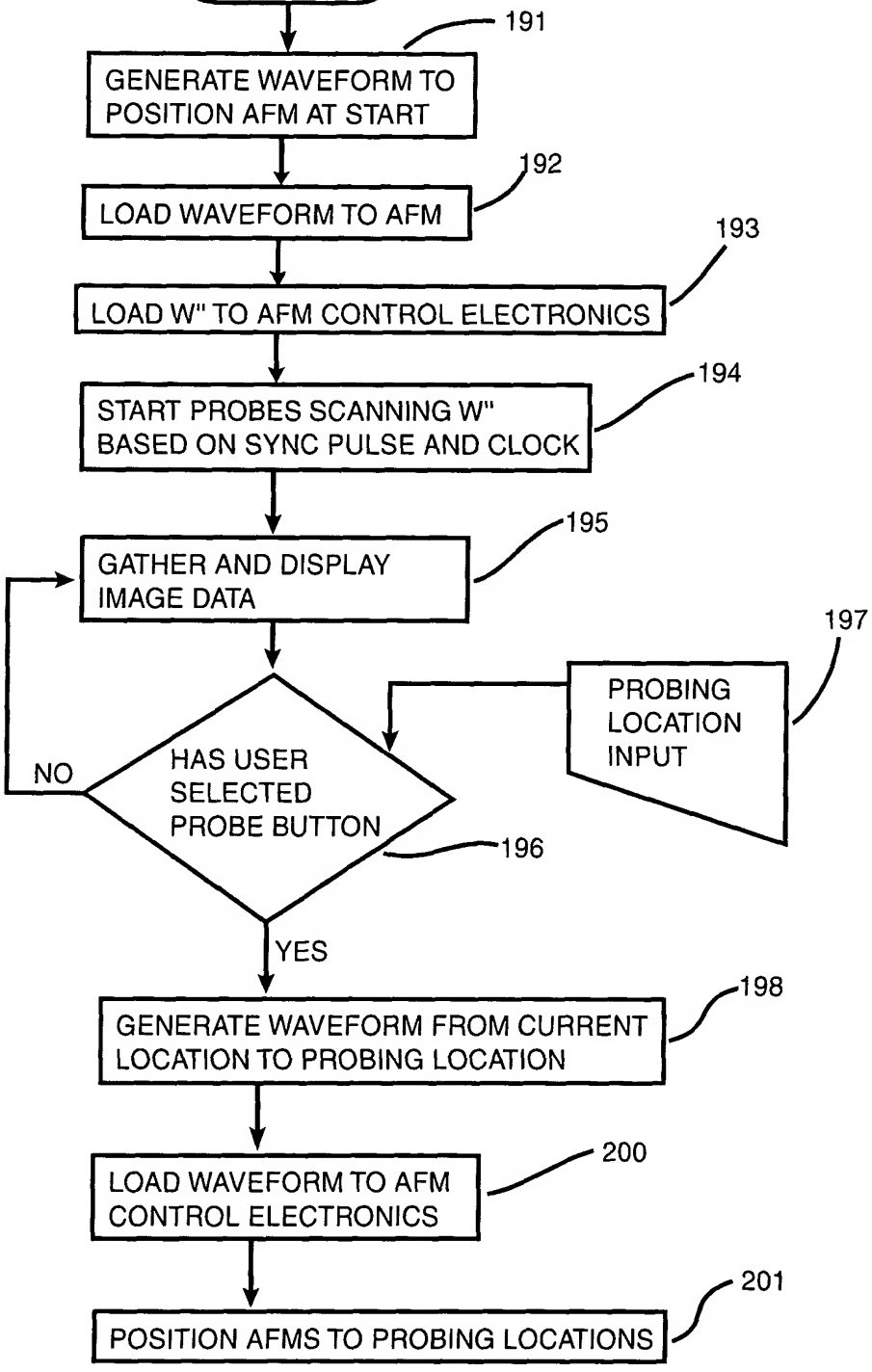

191
GENERATE WAVEFORM TO POSITION AFM AT START
192
LOAD WAVEFORM TO AFM
193
LOAD W" TO AFM CONTROL ELECTRONICS
194
START PROBES SCANNING W" BASED ON SYNC PULSE AND CLOCK
195
GATHER AND DISPLAY IMAGE DATA
197
PROBING LOCATION INPUT
NO
HAS USER SELECTED PROBE BUTTON
196
YES
198
GENERATE WAVEFORM FROM CURRENT LOCATION TO PROBING LOCATION
200
LOAD WAVEFORM TO AFM CONTROL ELECTRONICS
201
POSITION AFMS TO PROBING LOCATIONS

FIG.6B

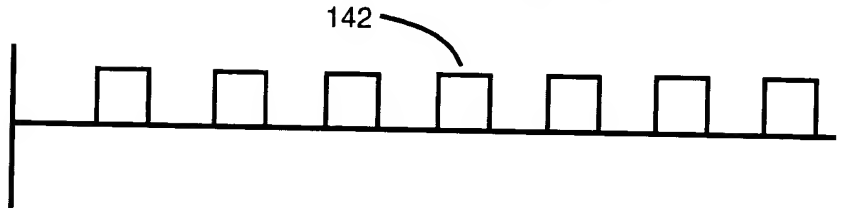


FIG.7A

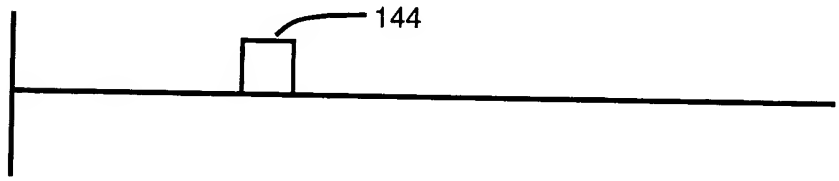


FIG.7B

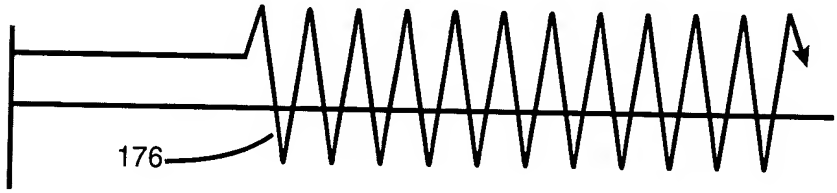


FIG.7C

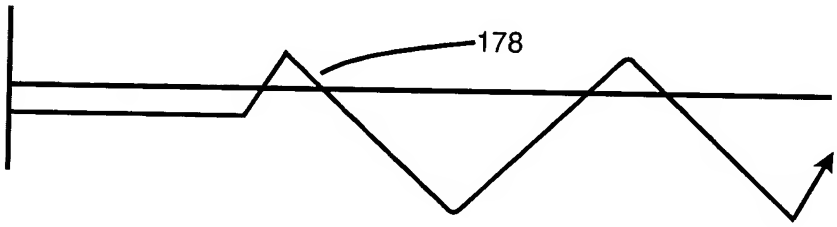


FIG.7D

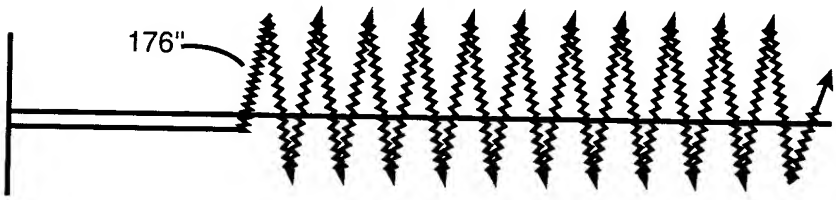


FIG.7E

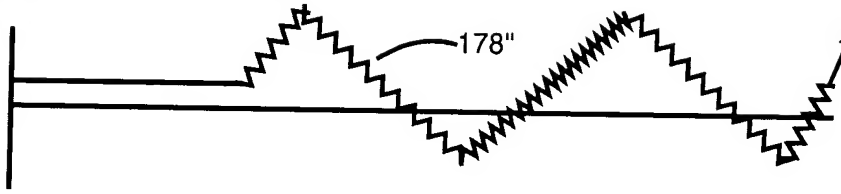


FIG.7F

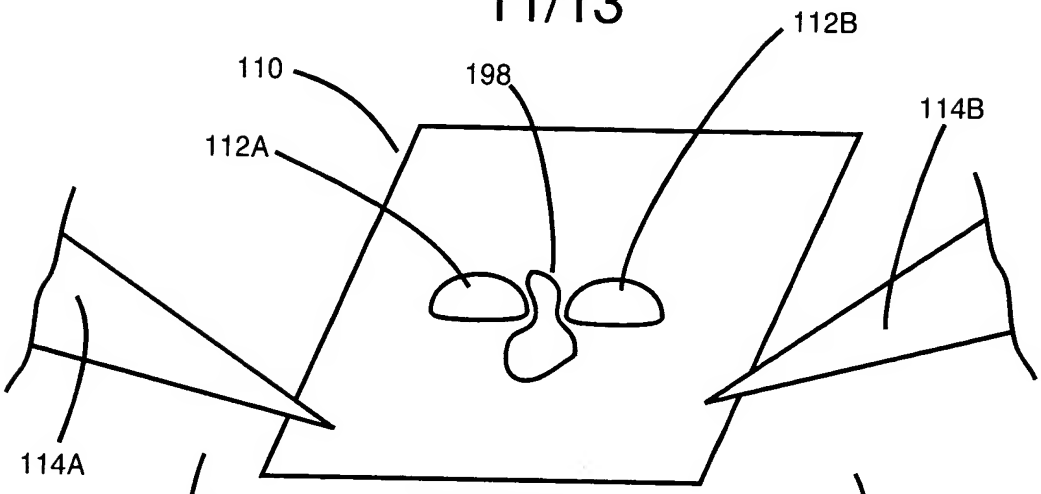


FIG.8A

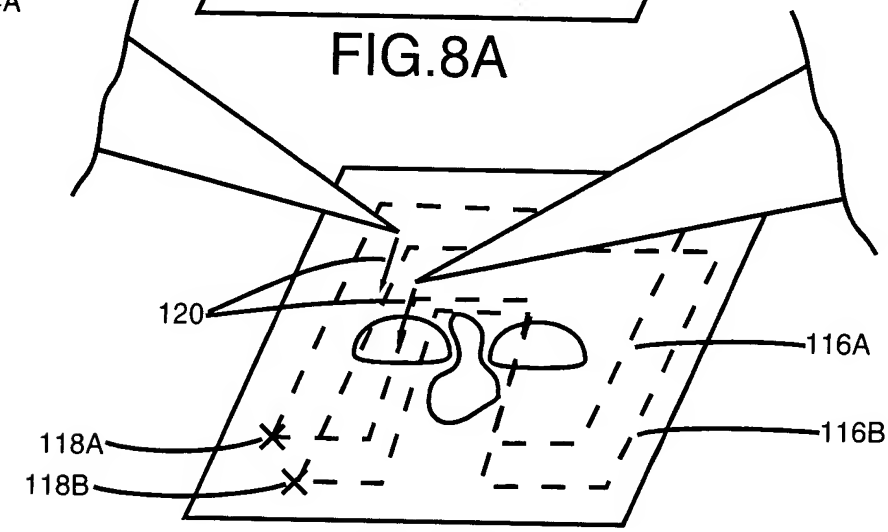


FIG.8B

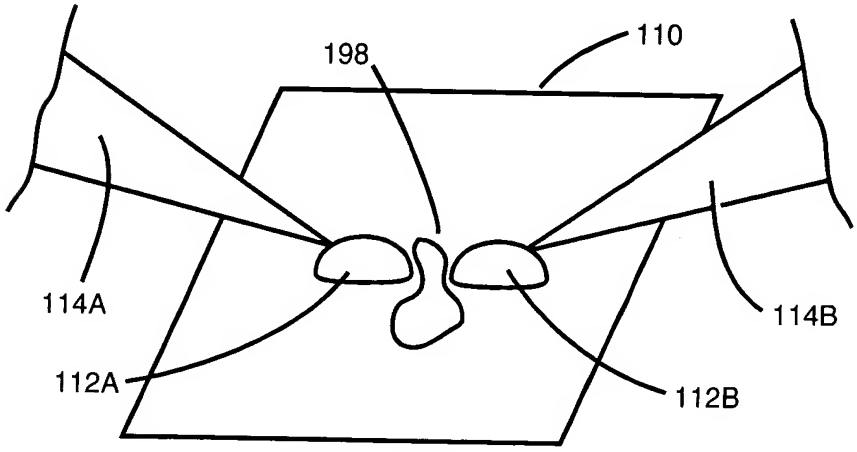


FIG.8A

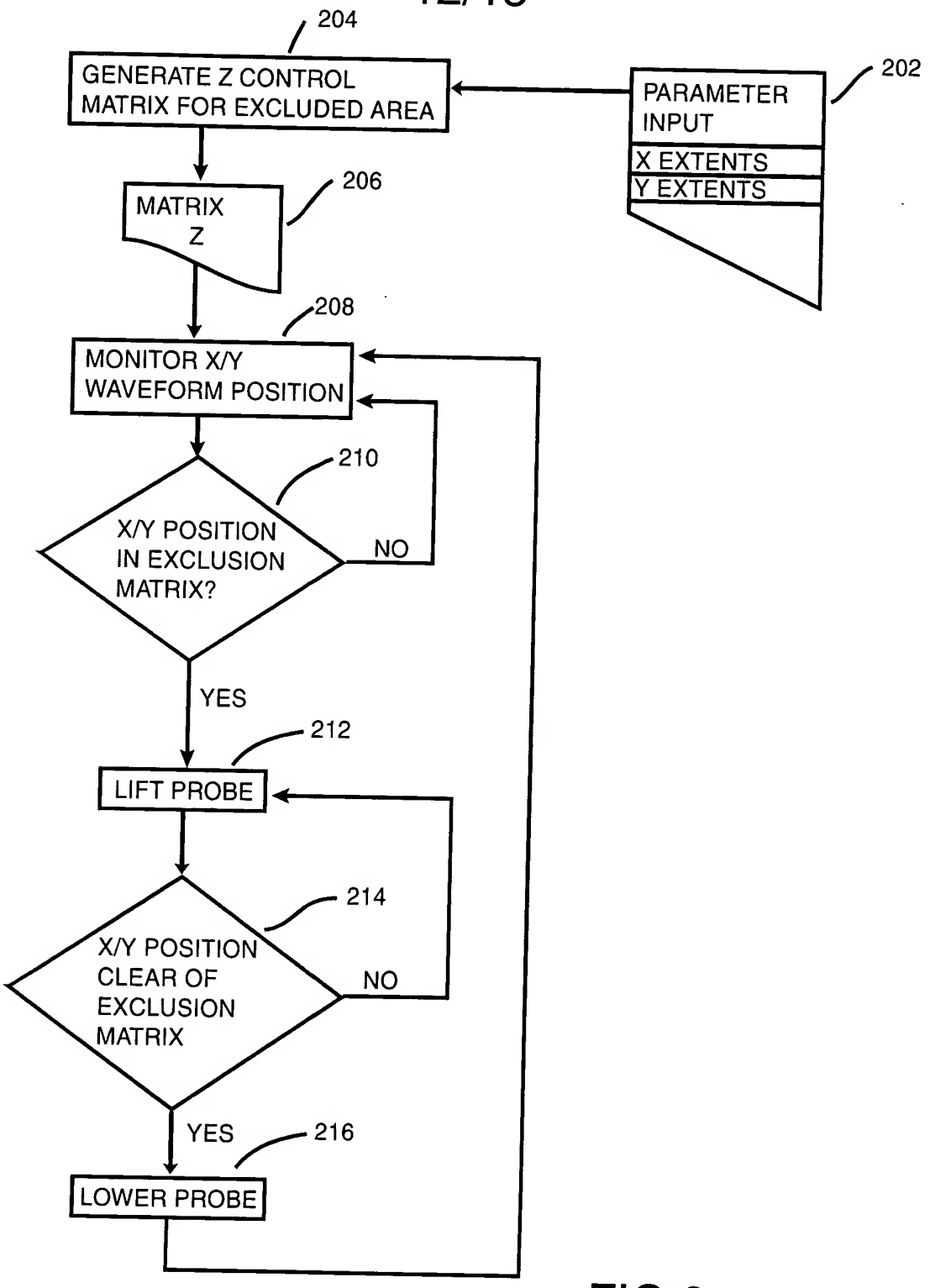

204
GENERATE Z CONTROL MATRIX FOR EXCLUDED AREA
202
PARAMETER INPUT
X EXTENTS
Y EXTENTS
206
MATRIX Z
208
MONITOR X/Y WAVEFORM POSITION
210
X/Y POSITION IN EXCLUSION MATRIX?
NO
YES
212
LIFT PROBE
214
X/Y POSITION CLEAR OF EXCLUSION MATRIX
NO
YES
216
LOWER PROBE

FIG.9

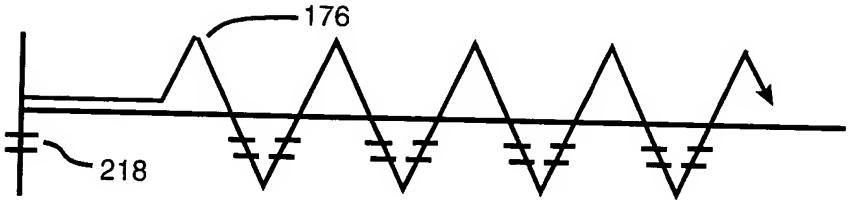


FIG.10A

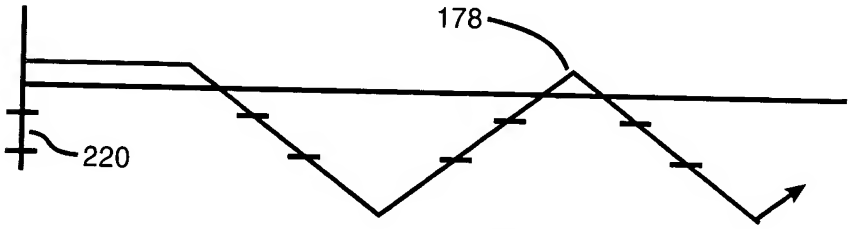


FIG.10B

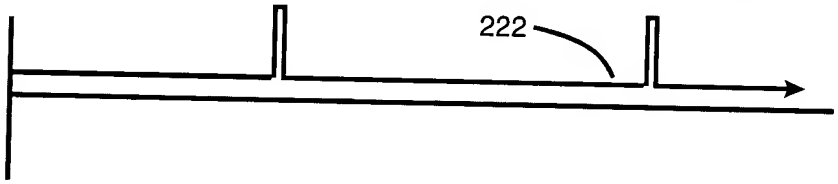


FIG.10C